TURNER ENTERPRISES, INC.

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U.S. Department of Transportation
Docket Management System
1200 New Jersey Ave, SE
West Building Ground Floor, Room W12-140
Washington, DC 20590

Re: Petition for Exemption from 14 CFR Parts 61, 91, and 137 for use of Agricultural UAS Weighing More than 55 Pounds

PETITIONFOR EXEMPTION
AMENDMENT AND ADDITIONAL INFORMATION

To Whom is May Concern:

Pursuant to 49 U.S.C. § 44807 and 14 C.F.R. Part 11, Turner Enterprises, Inc. ("**Petitioner**") hereby petitions the Federal Aviation Administration (FAA) for exemption from §§ 61.3(a)(1)(i); 91.7(a); 91.119(c); 91.121; 91.151(b); 91.405(a); 91.407(a)(1); 91.409(a)(1) and (a)(2); 91.417(a) and (b); 137.19(c), (d), (e)(2)(ii), (e)(2)(iii) and (e)(2)(v); 137.31; 137.33; 137.41(c); and 137.42 of Title 14, Code of Federal Regulations, to the extent necessary to allow Petitioner to operate an unmanned aircraft system (UAS) weighing 55 pounds or more (not to exceed 92.6 pounds) within visual line of sight (VLOS) during daytime operations in accordance with the safety measures specified in this Petition to dispense agricultural chemicals as permitted under South Carolina Commercial Applicator's license number C0034004, categories IA (Plants) and 11 (Aerial). The name and address of the Petitioner is:

Turner Enterprises, Inc.
Attn: Mr. James Bramblett Bradham
2957 North Santee River
Georgetown, SC 29440

The operations proposed herein involve a single pilot in command (PIC) operating a single DJI Agras T-16 serial number 1PKDH8.10010R81 (the "**T16**") legally on property in South Carolina owned by the Turner Family and managed by Turner Enterprises, Inc., of which the PIC James Bramblett Bradham is an employee and Manager. Operation would be confined to the approximately 5000 acres adjacent to or near the above listed address at less than 400 feet MSL in Class G airspace. The listed maximum takeoff weight at sea level is 41 kilograms (90.4 lbs). If granted an exemption, this UAS will be operated

at sea level.

The proposed operations will be in compliance with all safety requirements in as set forth herein and in compliance with South Carolina Commercial Applicator's License C0034004, categories IA (Plants) and 11 (Aerial).

The FAA has previously issued a grant of exemption for operations of UAS weighing 55 pounds or more in Exemption No. 18009 (the "**Powers Flight Group Exemption**"). Petitioner respectfully requests a grant of exemption relief for this Petition because such grant is in the public interest and the operations proposed in this petition will provide a level of safety at least equal to the existing rules. Furthermore, Petitioner's experience in conducting commercial agricultural-related services make it a suitable candidate for the agricultural operations described herein.

1. Description of Petitioner, the Proposed UAS Operations, and the UAS.

a. Description of Petitioner

Petitioner is an entity based in Atlanta, Georgia and its UAS operations are managed by Mr. Bradham, an employee and Manager of property owned by the Turner Family and managed by Turner Enterprises, Inc. of. Petitioner's mission in applying for this exemption is to improve waterfowl habitat by controlling invasive species that are detrimental to waterfowl and support agricultural efforts by controlling flora and zoological pests that compete with or prohibit the development of agricultural crops intended to benefit waterfowl. Petitioner plans to use the UAS to control areas of waterfowl habitat that cannot be accessed by conventional agricultural equipment, such as tractors. Dispensation of agricultural chemicals will be done in a manner regulated by the State of South Carolina and the EPA as well as through consultation with State and Federal biologists, private biologists, and recognized experts.

As of the date of this petition, Petitioner is currently in the process of obtaining its Agricultural Aircraft Operator Certificate under 14 CFR Part 137 through the FAA South Carolina Flight Standards District Office (FSDO). Petitioner has provided the FAA with all necessary information as required for an Agricultural Aircraft Operator Certificate, and has been advised by the FSDO that they are prepared to proceed with the certification as soon as Petitioner has been granted this exemption.

b. Description of Proposed Operations

i. Concept of Operations (CONOPs)

This petition application will be directed toward the use of a DJI Agras T-16 agricultural drone, serial number 1PKDH8.10010R81 in Class G airspace at less than 400 feet MSL. The intended use of this UAS will be to assist in the management of waterfowl habitat owned by the Turner family and managed by Turner Enterprises, Inc., of Atlanta Ga., of which the PIC listed above, is an employee and Manager. The UAS will be used entirely for Plant Pest Control as permitted in the above listed S.C. Commercial Applicator License, including, but not limited to:

- Control of invasive plant species

- Control of plants which compete with crops
- Control of zoological species which damage natural or planted crops
- Aerial planting of seed

There will be no sale of agricultural products from the property, as all efforts are intended to create, conserve, and manage waterfowl habitat. All agricultural chemicals will be applied strictly conforming to EPA labeling instructions. Seed applied by the UAS will be planted according to accepted seasons and methods, as recommended by Clemson University, personal experience, and advice from other biologists and experts. Special attention will be given to conditions that could result in drift or unintentional exposure to wildlife, livestock, people, or structures that should not be exposed. All Federal and State laws and regulations will be strictly observed.

Petitioner demonstrates its capabilities for operations of UAS by holding Part 107 operator certificate number 4482267 and South Carolina Commercial Applicator's License C0034004, categories IA (Plants) and 11 (Aerial).

ii. Pre-Flight Procedures

All flight operations will be preceded by an examination of the UAS according to the Petitioner's UAS Flight Operations and Procedures Manual and the T-16 User Manual. This will include, but not be limited to cleaning, checking for loose or worn parts, battery level and condition, communication with controller device, fittings, blades, etc. Further precautions will be made by using the PAVE, IMSAFE & DECIDE model to determine potential safety issues with the PIC or the environment, as well as to be prepared for unforeseen circumstances such as risk of collision, sudden weather changes, and malfunction of the UAS. Appropriate PPE will be on site at each flight to ensure a minimum of risk to PIC and crew. This will include fire extinguishers, chemical PPE, water, towels, soap and any such materials that are deemed prudent or required by Federal or State Law to mitigate exposure to chemicals during application.

iii. Flight Procedures

All takeoffs will be conducted at a safe distance from PIC and crew. PIC will maintain constant visual contact with the UAS at all times. Crew will assist PIC by systematically scanning for hazards such as other aircraft, birds, trees, or anyone entering the flight area. Appropriate evasive moves will be made as soon as any potential hazard is observed. Dispensation of chemical or seed will be done at distances necessary to ensure that people, property and the environment are not exposed to risk. Appropriate first aid supplies will be on site at each flight. The UAS guidance system will land the UAS at its takeoff point in the event communication with the controller is lost. In the event of UAS failure resulting in a crash, full chemical PPE will be on site for recovery of the UAS to avoid chemical exposure to PIC and crew. Any injury or accident involving damage to property will be reported to the appropriate authority.

iv. Post-Flight Procedures

Landing will be conducted at a safe distance from PIC and crew. Any leftover chemical will be returned to its original approved container. All tanks will be washed and flushed in a manner consistent

with State and EPA regulation. The UAS will be cleaned and wiped free of chemical, and then inspected for damage, wear, loose parts, or other items requiring attention or repair. All UAS components will be safely stored. A record of the flight will be entered in a log book or electronic device including location, flight duration, and type of dispensation including chemical identification.

v. Checklists

Petitioner attaches and submits with this application the Petitioners detailed checklist to be used prior to, during, and after every flight under this exemption.

vi. Pilot Training Requirements and History

The PIC Mr. Bradham for Petitioner has logged more than 250 hours of flight on numerous UAS, including approximately 200 hours on DJI drones including the "Phantom 4" which uses the same control system as the Agras (Part 107 certificate number 4482267). There have been no accidents or malfunctions. R. Bradham also holds a Commercial grade applicators license with the State of South Carolina including the CORE, Plant, and Aerial certifications. Mr. Bradham has accompanied other pilots using the Agras T-16 in order to learn the capabilities and limits of this particular UAS.

Any person acting as PIC will have completed Petitioner's required training program and requirements. Petitioner's Flight Operations Training manual is attached to this petition. Such training requires that any pilot complete training with a commercial Drone Pilot School and successfully passed the Part 107 exam receiving the certification. In addition, any crew that assist with the operation will have successfully attained a Part 107 certification.

Any person acting as a pilot or crew for an operation under this exemption will be trained properly using the Petitioner's UAS Flight Operations and Procedures Manual, Petitioner's Flight Operations Training manual, Petitioner's Flight Operation Safety Requirements and Risk Mitigation, Petitioner's Pre-Flight and Post-Flight Safety Checklist, the DJI Agras T-16 User Manual, and the DJI Agras T-16 Safety Guidelines. Any person acting as PIC shall have 20 hours of total flight time of a multi-rotor system as the PIC with at least 10 take-off and landings. In additional, any person involved in the operation shall receive training in the following subjects prior to operating the UAS:

a. 14 CFR Part 107 Rules and Compliance
b. 14 CFR Part 137 Rules and Compliance
c. Company policy
d. UAS crewmember's role in safety
e. Use of Safety Checklist
f. Emergency safety procedures
g. Standard operating procedures, including:
    i. maintaining VLOS of the UAS without the assistance of any device other than corrective lenses
    ii. scanning the airspace where the UAS is operating for any potential collision hazard
    iii. maintaining awareness of the position of the UAS through direct visual observation

All crewmembers and pilots shall review the company safety policy and procedures on an

annual basis and that review shall be documented in their training history. All sections of training and instruction will be reviewed periodically as continuing education for both PIC and any crew assisting with the operation to remain up to date on all aspects of Part 107 and any additional information recommended or required by the FAA or the State of South Carolina.

c. Description of the UAS

The T-16 is a high-performance COTS UAS manufactured by DJI, a well-established and world-renowned UAS manufacturer, and is capable of dispensing water, pesticides, herbicides, and seeds. The T-16 is also equipped with upgraded sensors that provide a horizontal field of view (FOV) of 100 degrees. These sensors and equipment can monitor any areas that are targeted for treatment.

The T16 uses six 33-inch foldable propellers. The diagonal wheelbase is 6.17 feet, and it is 2.40 feet tall. The airframe weighs 40.8 pounds and can carry a 16-liter liquid spray tank for a standard takeoff weight of 87.1 pounds (including the battery) and a maximum flying speed of 22.4 mph. The maximum takeoff weight of the T16 is 90.4 pounds at sea level. The tank has a flow rate through eight nozzles of 4.8 liters per minute or 75.6 gallons per hour (1.268 gallons per minute). The T16 has the capacity to spray 24.7 acres per hour. This rate will change as nozzles, fluid viscosity, chemical mix, tubing length and internal diameter, fluid temperature, and other factors change.

The T16 integrates a number of cutting-edge DJI technologies, including the new GL300N Flight Controller, and a Digital Beam Forming radar technology and OcuSync 2.0 HD transmission technology that includes a wide-angle FPV camera and spotlight that provide additional reliability during flight. Additional information regarding the T16 is provided in the T16 user manual, which is publicly available online and attached separately to this Petition for reference. Given the description and performance specifications of the T16, Petitioner has identified the following risks and mitigation measures:

i. UAS Risks and Petitioner's Mitigation Measures

Risk 1: UAS Lost Signal, UAS Low Battery, UAS Lost Visual Line of Sight.

Mitigation: The T16 integrates the new GL300N Flight Controller and an upgraded radar sensing system. The upgraded radar system increases flight safety by employing Digital Beam Forming (DBF) technology which allows for 3D point cloud imaging that fully senses the surrounding environment and aids in circumventing obstacles. When used with the T16 Intelligent Operation Planning System and the DJI Agriculture Management Platform, a user can plan operations, manage flights in real-time, and closely monitor aircraft operating status. With a fault-tolerant control system, the UAS can land safely even in the event of propulsion system failure.

Mitigation: The T16 has on-board safety features that ensure it can operate safely under both normal and contingency operating conditions. These features include automation to increase safety and reduce pilot workload. Some examples are the Return to Home (RTH) feature that will navigate the T16 to a certain RTL altitude, then transport the T16 to the location of takeoff, unless overridden with a new home location. RTH activates in the case of lost signal, low battery, and RTH can be activated by the pilot for reasons such as loss of visual line of sight or loss of control of the T16. The T16 incorporates fly away prevention measures via mission planning software that permits creation of geofencing areas that

prohibit flight paths over unwanted terrain.

Mitigation: The PIC will be trained in accordance with Petitioner's Flight Operations Training program, which responsibilities include maintaining VLOS of the UAS without the assistance of any device other than corrective lenses, scanning the airspace where the UAS is operating for any potential collision hazard, and maintaining awareness of the position of the UAS through direct visual observation. The aircraft will be operated within VLOS of the PIC at all times. If the PIC is unable to maintain VLOS during flight, the flight operation will be terminated as soon as practicable. The PIC may also use an observer when able and necessary, and any observer will hold a Part 107 certificate.

Risk 2: Flight over unwanted area.

Mitigation: Flight will only be initiated and conducted over uninhabited areas. The new GL300N Flight Controller and DJI assistant software permits Petitioner to create geofenced areas that prohibit flight paths over unwanted terrain. Moreover, the T16 will remain in VLOS, and the operator will manually control the T16 to avoid flight over unwanted areas as needed.

Risk 3: UAS Flyaway

Mitigation: Flyaways can occur for a variety of reasons, most commonly UAS misconfiguration (compass), lack of following pre-flight checklist (setting RTH location/home), or operator error. Petitioner mitigates this risk through the ability to take control of the T16 at any time using the radio controller as described above. Furthermore, the flight time of the T16 mitigates the risk of flyaway.

Mitigation: All operations will be conducted under safe conditions and during times of the day when the area of operations is closed to the public, and clear of all persons unrelated to the operations. Operations shall be conducted from and over predetermined, uninhabited areas and the PIC will ensure the entire operational area will be controlled to eliminate or minimize any risk to persons and property on the ground, as well as other users of the National Airspace System (NAS). This area of operation will include a defined lateral and vertical area where the aircraft will operate and will be geofenced to prevent any lateral and vertical excursions by the operating aircraft. Safety procedures will be established for persons, property and applicable airspace within the area of operation. A briefing will be conducted regarding the planned UAS operations prior to any operations conducted at each area and all personnel who will be performing duties within the boundaries of each area of operation will be present for this briefing before commencing operations. Additionally, all operations conducted under this exemption will occur only in areas of operation that have been physically examined by Petitioner prior to conducting the operations.

Mitigation: Petitioner has a redundant failsafe in place that takes over in case of a flyaway. For example, two points are programmed into the software controlling the aircraft, and these points create a geographic fence for the flight computer. The T16 will maintain limits within the determined area. If the T16 falls outside of the area it will stop and hover in the location breached, allowing the PIC to take manual control.

Risk 4: Inclement Weather

Mitigation: The T16 has water tight seals that allows the aircraft internals to be protected from weather. This provides some protection and allows the PIC to fly the UAS under light rain. In the event of a quick downpour, this housing allows the operator to return the aircraft home, or quickly land it, before systems begin to fail. Before every flight, Petitioner will check the weather to ensure favorable weather conditions. If weather is IMC or below VFR standards flights will not be conducted.

Risk 5: Software error causes operational issue.

Mitigation: The navigational and flight control equipment are OEM components from DJI, a large equipment manufacturer selected for being common, well-supported, and safe due to testing by the manufacturers and iterative improvements caused by users in the field reporting errors (as opposed to being purchased from companies that are selling prototype and initial-run units prone to manufacturing and engineering problems).

Risk 6: Malfunction of spraying equipment (nozzles, pumps, tubing) causes spray of target that should not be sprayed.

Mitigation: TeeJet spray nozzles are a common or standard nozzle for agricultural spraying operations. The T16 uses 8 off-centered, flat-fan-pattern nozzles (Model# XR11001VS) that produce a straight thirteen-foot wide swath when sprayed from 5 feet above a target. The quick-change nozzle set-up allows us to swap nozzles if the chemical mix, target composition, or environmental conditions dictates using different nozzles.

Risk 7: Failure of mission planner software.

Mitigation: Petitioner's PIC is able to manually take control of the T16 at any given time. Petitioner utilizes a radio controller manufactured by DJI that is an industry standard model and includes a toggle switch to transition from programmed to manual flight control. This permits the PIC to observe the T16 in flight and take over for any reason.

2. A Grant of Exemption is in the Public Interest

A Grant of Exemption for this Petition is in the public interest because of the following:

a. Affiliated with R. E. "Ted" Turner, and recognizing his lifelong commitment to the environment and wildlife, Petitioner can represent that efforts to improve habitat on the property described would, in fact, be very beneficial to the public, as a whole in that waterfowl are migratory and are an extremely important part of our ecosystem. Phragmites, which are not native to the United States and were introduced by accident or intent, have spread rapidly in the United States. Certain species spread quickly through marshes and wetland areas, replacing native plants, denying fish and wildlife nutrients and space, blocking access to the water for swimming, fishing and other recreation endeavors, spoil shoreline views, and posing a fire hazard. The treatment that has been most successful is the application of an aquatic herbicide followed by burning of the roots and stalks to prevent regrowth. This can lead to significant improvement in pond conditions for indigenous species and migratory birds. The property intended for use under this

exemption is an important part of the migratory destination and has been encroached upon by numerous invasive species which prohibit adequate waterfowl activity. This can be restored through the responsible use of UAS activity capable of reversing environmental damage caused by non-native invasive species and the presence of other pests, both plant and zoological.

b. The operation of the UAS for the purposes of this petition would not adversely affect safety if used properly and would in fact create a safer environment for employees, visitors, and neighboring properties in that the dispensation of chemicals is performed at a greater distance from humans than if it were to be done by any ground vehicle, where the operator is in close proximity to the chemical being dispensed. Dispensation would be done according to State and Federal regulation, in a manner that avoids drift, considers weather effect, and occurs in an area where no buildings or traffic exists.

c. Applications by manned aircraft and helicopters for agriculture carries significantly higher risks of fatality for the pilot as opposed to the UAS operator. The enhanced safety achieved using an unmanned aircraft with the specifications described in this petition, as opposed to the much larger, manned aircraft carrying fuel and crew or passengers, is safer and also exposes workers and other people on the ground to significantly less risk. Additionally, the batteries used in a UAS system are not as flammable and explosive as 100LL or Jet A fuel. If there was an emergency where the UA crashed, there is a significantly lower chance of individuals being injured from an explosion or fire.

d. Finally, manned aircraft and helicopters can produce significant noise pollution that disrupt the public's ability to enjoy both private and public property. UAS are much quieter and will not disrupt the public as much as manned aircraft; thus, the benefit will be recognized as a reduction in noise pollution to any neighbors.

3. A Grant of Exemption Will Provide a Level of Safety at Least Equal to the Existing Rules.

Listed below are the specific FARs from which an exemption is sought, the rationale for why an exemption is needed, and a brief summary of the operating procedures and safeguards, that will ensure that the proposed operations will be conducted at a level of safety that is at least equal to that provided by the rule from which exemption is sought. The applicable FARs are included in three main categories: (a) Part 91 FARs pertaining to the UAS; (b) Part 91 UAS Operating Parameters, (c) Part 137 Certification Requirements; and (d) Part 61 Pilot Certification requirements.

The operation of the UAS for the purposes of this petition would not adversely affect safety if used properly and would in fact create a safer environment for employees, visitors, and neighboring properties in that the dispensation of chemicals is performed at a greater distance from humans than if it were to be done by any ground vehicle, where the operator is in close proximity to the chemical being dispensed. Dispensation would be done according to State and Federal regulation, in a manner that avoids drift, considers weather effect, and occurs in an area where no buildings or traffic exists.

a. <u>FARs Pertaining to the UAS</u>

Petitioner seeks an exemption from the following maintenance-related FARs of Part 91:

- **§ 91.405(a)** - Maintenance required
- **§ 91.407(a)(1)** - Operation after maintenance, preventive maintenance, rebuilding, or alteration
- **§ 91.409(a)(1) and (2)** - Inspections
- **§ 91.417(a) and (b)** - Maintenance records

An exemption from these FARs is necessary because the provisions are either not compatible with or are unnecessary in the context of the proposed UAS operations.

Petitioner seeks an exemption from the following maintenance and inspection-related FARs: §§ 91.405(a) Maintenance required, 91.407(a)(1) Operation after maintenance, preventive maintenance, rebuilding, or alteration, 91.409(a)(1) and (2) Inspections, and 91.417(a) and (b) Maintenance records. These regulations specify maintenance, inspection, and records standards in reference to FAR § 43.6. An exemption from these regulations is needed because Part 43 and these sections apply only to aircraft with an airworthiness certificate, which the UAS to be operated under this exemption will not have, and because compliance with these regulatory provisions in the context of UAS operations is not feasible.

An equivalent level of safety will be achieved because maintenance, inspections, and records handling will be performed in accordance with the manufacturer's user manual and any required manufacturer safety or service bulletins, and if this Petition is granted, any conditioning limitations. For example, the manufacturer's user manual and the Petitioner's own standard operating procedures require the PIC to conduct a pre-flight inspection of the UAS and all associated equipment to account for all discrepancies and/or inoperable components. Maintenance will be performed and verified to address any conditions potentially affecting the safe operation of the UAS, and no flights will occur unless and until all flight critical components of the UAS have been found to be airworthy and in a condition for safe operation.

A functional test flight will also be conducted in a controlled environment following the replacement of any flight critical components, and, as required by the user manual, the PIC who conducts the functional test flight will make an entry in the UAS aircraft records of the flight. Functional flight tests will not involve the carriage of hazardous materials, will not be a multi-vehicle operation, and the vehicle will have an all-together weight below 55 pounds during flight testing. In addition, the operator will be required to follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the UAS and its components. Along with the preflight checklists, Petitioner's own standard operating procedures, and a routine maintenance program, Petitioner believes an equivalent level of safety is met, and that equipment at risk of failure can be safely identified before flights occur.

In the Powers Flight Group Exemption, the FAA determined that the proposed UAS operations required exemption from FAR §§ 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), on the fact that "petitioner had a documented history of active quality control including identification and correction of procedural deviations and mechanical anomalies, including necessary design changes, to improve system reliability" and that the achievement of an adequate level of safety required certain conditions and limitations. Petitioner has proposed in this Petition a number of limitations related to

maintenance, inspections, and records which it believes provide a level of safety at least equivalent to that provided by FAR §§ 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b). For this reason, and consistent with the Powers Flight Group Exemption, Petitioner requests an exemption from these sections without having to perform the inspections and maintenance items required by FAR §§ 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b).

b. FARs pertaining to UAS Operating Parameters

Petitioner seeks an exemption from the following operating parameter-related FARs in Part 91:

- **§ 91.7(a)** - Civil aircraft airworthiness
- **§ 91.119(c)** - Minimum safe altitudes
- **§ 91.121** - Altimeter settings
- **§ 91.151(b)** - Fuel requirements for flight in VFR conditions

An exemption from these FARs is necessary because the provisions are either not compatible with or are unnecessary in the context of the proposed UAS operations.

Because there will be no airworthiness certificate issued for the UAS, Petitioner seeks an exemption from § 91.7(a), which requires that a civil aircraft be in an airworthy condition to be operated. While the UAS operated by Petitioner will not have an airworthiness certificate, consistent with the FAA's determination in the Powers Flight Group Exemption, the PIC may determine the UAS is in an airworthy condition prior to flight. As described more fully in the operating documents, this is achieved through adherence to Petitioner's routine pre-flight checklist, regularly scheduled maintenance, and the enhanced pilot training requirements of Petitioner's Flight Operations Training program.

Petitioner also seeks an exemption from FAR § 91.119(c) to the extent necessary to allow UAS operations over other than congested areas at altitudes lower than those permitted by rule. The ability to operate at those altitudes is one of the key benefits of using UAS for the proposed activities. An equivalent or greater level of safety will be achieved given the size, relatively light weight, and slow speed of the UAS, as well as the controlled location where the operations will occur.

As described in herein, Petitioner will maintain an average operating altitude of 20 feet AGL during spray operations and a maximum altitude of 400 feet AGL which is significantly lower than the 500 feet limit set in the Powers Flight Group Exemption. Furthermore, Petitioner's operating parameters will be limited to uninhabited areas.

Petitioner will ensure all paperwork at the state and local level will be filed before and after operations. Petitioner will comply with all state laws regarding the application of agricultural products, including agency notification, mapping, and specified safety procedures. In the controlled environment where Petitioner operations will occur, flying at a low altitude increases the aircraft's efficiency, without posing any increased risk to person or property. Even at these low altitudes, Petitioner's UAS operations will be conducted at a level of safety equal to or greater than that achieved by other large UAS performing similar activities at the altitudes required by § 91.119.

Petitioner also requests an exemption from § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. In the Powers Flight Group Exemption, the FAA deemed an equivalent level of safety to the requirements of § 91.121 can be achieved in circumstances where the PIC uses an alternative means for measuring and reporting UAS altitude, such as global positioning system (GPS). The T16 will be equipped with GPS or other equipment for measuring and reporting UAS altitude, and the PIC will check the UAS altitude reading prior to each takeoff, effectively zeroing the UAS's altitude at that point. Consistent with previously granted exemptions, these requirements ensure that an equivalent level of safety will be achieved, and an exemption from the requirements of § 91.121 is therefore appropriate.

Finally, Petitioner seeks an exemption from FAR § 91.151(b), which would require a 20-minute fuel reserve. In the Powers Flight Group Exemption, the FAA determined that a requirement prohibiting the PIC from beginning a UAS flight unless (considering wind and forecast weather conditions) there was enough available power for UAS to operate for the intended operational time and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater would ensure an equivalent level of safety to the fuel requirements of § 91.151. Petitioner will adhere to the same reserve power requirement and an exemption from § 91.151's fuel requirements for flight in VFR conditions is therefore appropriate.

c. **FARs pertaining to Part 137 Certification Requirements**

Petitioner seeks an exemption from the following FARs in Part 137:

- **§ 137.19(c), (d) and (e)(2)(ii)(iii) and (v)** - *Certification requirements*
- **§ 137.31** - *Aircraft requirements*
- **§ 137.33** - *Carrying of certificate*
- **§ 137.41(c)** - *Personnel*
- **§ 137.42** - *Fastening of safety belts and shoulder harnesses*

An exemption from these FARs is necessary because the provisions are either not compatible with or are unnecessary in the context of the proposed UAS operations.

In the Powers Flight Group Exemption, the FAA determined that relief from § 137.19(c) was necessary to permit persons holding a remote pilot certificate to act as pilot in command for agricultural aircraft operations under the exemption. Petitioner will comply with all knowledge and applicable skill requirements in part 137 as well as petitioner's training requirements. The FAA also determined, in the Powers Flight Group Exemption, that the requirement to hold a commercial or airline transport certificate under § 137.19(c) was not a reasonable requirement when the proposed operations would not adversely affect safety. The basis for the relief was that Powers Flight Group's remote PICs would comply not only with the requirements of Part 107, subpart C, but also with the additional knowledge and applicable skill requirements in § 137.19(e)(1) and (2)(i), (iv) and (vi). The relief was also based, in part, on Powers Flight Group's compliance with its training requirements.

The operations proposed by Petitioner herein are similar to that previously approved by the FAA in the Powers Flight Exemption. Consistent with the FAA's prior analysis in the Powers Flight Group

Exemption, Petitioner will achieve a level of safety at least equal to the existing rules through compliance with the requirements of Part 107, subpart C, the additional knowledge and applicable skill requirements in § 137.19(e)(1) and (2)(i), (iv) and (vi), and compliance with the training and risk mitigation measures.

Consistent with the FAA's prior analysis of §§ 137.19(d) and 137.31 in the Powers Flight Group Exemption, Petitioner will be capable of ensuring that the UAS are in a condition for safe operation based upon a thorough pre-flight inspection and compliance with the operating documents. The T16 has a proven operational history and contain design safety features such that operations conducted under the requirements of this exemption will not adversely impact safety.

Petitioner seeks an exemption from the knowledge and skill test requirements in § 137.19(e)(2)(ii), (iii), and (v) because those requirements are not compatible or applicable to Petitioner's proposed UAS operations. Consistent with the FAA's prior analysis in the Powers Flight Group Exemption, Petitioner's training (see attached Flight Operations Training Manual) provides the remote PIC with the necessary skills to safely operate the UAS. For this reason, granting relief from a demonstration of the skills described in § 137.19(e)(2)(ii), (iii), and (v) will not adversely impact safety, and therefore relief is warranted. Also, consistent with the FAA's finding in the Powers Flight Group Exemption that relief from the associated knowledge and skill test requirements of § 137.41(c) is also warranted because of the relief provided to § 137.19(e)(2)(ii), (iii), and (v), Petitioner seeks an exemption from the interrelated knowledge and skill test requirements of § 137.41(c).

Petitioner seeks an exemption from § 137.31(b) and § 137.42 which relate to the installation and use of a shoulder harness and safety belt on an aircraft. An exemption from these requirements is warranted because Petitioner's UAS do not have an onboard pilot and these regulations are intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations. For this reason, granting the requested relief from §§ 137.31(b) and 137.42 will not adversely impact safety.

Petitioner requests relief from § 137.33(a) which requires that a facsimile of the agricultural aircraft operator certificate be carried on the aircraft. The FAA has previously determined that relief from §§ 91.9(b)(2) and 91.203(a) and (b) for the carriage of the aircraft flight manual and aircraft registration onboard the aircraft is not necessary. Consistent with the FAA's prior analysis in the Powers Flight Group Exemption, an exemption is warranted here provided that a facsimile of any applicable certificates be kept in a location accessible to the remote PIC. Finally, given that Petitioner's UAS will not have an airworthiness certificate, relief from § 137.33(b), which requires the airworthiness certificate (if not carried in the aircraft) be kept available for inspection at the base of dispensing operation is conducted, is not applicable. Petitioner will keep any certificates available for inspection.

Petitioner has attempted to identify the appropriate FARs from which an exemption is needed in order to conduct the proposed operations in this Petition for Exemption. To the extent that the FAA determines that Petitioner needs an exemption from other FARs which are not addressed or explicitly named in order to conduct the proposed operations, Petitioner also seeks an exemption from those FARs for the reasons outlined above.

D. **FARs Pertaining to Pilot Certification**

Petitioner seeks an exemption from the following FARs in Part 61.

- **§ 61.3(a)(1)(i)** - Requirement for certificates, ratings, and authorizations

Petitioner will conduct the proposed operations under 14 CFR Part 91, rather than under part 107. In general, Part 91 is predicated on the presumption that the pilot in command conducting an operation under Part 91 holds an airman certificate under Part 61. As a result, the FAA has determined granting exemption from the requirement of § 61.3(a)(1)(i) to require a person holding a remote pilot in command certificate (with the appropriate training and demonstration of knowledge and skills required by this exemption) to conduct the operations to which this exemption applies will ensure clarity.

The statutory obligation for an airman certificate is codified at 49 U.S.C. § 44711(a)(2). Pilots who conduct operations under this exemption with a remote pilot in command certificate would comply with § 44711(a)(2), as the FAA described in the Operation and Certification of Small Unmanned Aircraft Systems final rule. The general requirements for all airmen include: eligibility, aeronautical knowledge and Transportation Security Administration (TSA) vetting. Given that the operation would occur only after airmen who hold a current remote pilot in command certificate have received specific training, have visited the area of operation and are fully capable of using the tools available to prepare for the operation, conduct comprehensive preflight actions, and conduct the operation only in a limited geographical area, the FAA has previously determined that a remote pilot certificate issued under 14 CFR Part 107 provides the FAA sufficient assurance of the pilots' qualifications and abilities to perform the duties related to the operations authorized under this Petition. The remote pilot in command certificate confirms Petitioner's eligibility, secures TSA vetting, and ensures the PIC has the requisite aeronautical knowledge for operating the UAS within the NAS.

Remote pilots such as Petitioner conducting operations under Part 107 must complete a detailed aeronautical knowledge test, unless they already hold a certificate under 14 CFR part 61, and meet the flight review requirements specified in § 61.56.9. As a result, all such pilots will have the requisite aeronautical knowledge that is a key component of safe completion of all operations that will occur under this exemption. In this regard, the FAA addressed the applicable parts of § 61.125 in the remote pilot in command certificate requirements.

For the reasons discussed below, this same rationale espoused by the FAA in previous approved exemptions, combined with Petitioner's proposed safety mitigations, also supports a finding that the proposed operations under the requested exemptions can be conducted without adversely affecting safety.

While it is generally true that operations involving UAS weighing 55 pounds or more could raise additional safety concerns when compared operations involving small UAS, the unique nature of the proposed operations, including the low-risk, controlled access of areas during any operations, will ensure that safety remains at least equal to the existing rules. While Part 107 will not apply to the proposed operations, wherever possible, Petitioner intends to conduct the proposed operations in accordance with Part 107.

Petitioner will be able to achieve a level of safety at least equal to that which would be obtained using a PIC holding a manned pilot certificate under Part 61 because Petitioner has instituted an

enhanced training program that provides aeronautical knowledge, experience, and flight proficiency tailored to UAS operations, including PIC compliance with Part 107, the applicable sections of Part 137, and continued periodic training after certification.

The following chart addresses each aeronautical knowledge requirement of § 61.125 and explains whether it is relevant to, different from, or addressed by Part 107 operations or Petitioner internal procedures:

§ 61.125 Aeronautical Knowledge	Petitioner's Operations
Applicable Federal Aviation Regulations of this chapter that relate to commercial pilot privileges, limitations, and flight.	Addressed by Part 107.
Accident Reporting	Addressed by Part 107.
Basic aerodynamics and the principles of flight	Topics applicable to unmanned aircraft are included in Part 107.
Meteorology	Applicable meteorology principles are covered under Part 107.
Safe and Efficient Operation of Aircraft	Covered by Part 107 and included in Petitioner's Flight Operations Training program.
Weight and Balance	"Loading and Performance" is addressed by Part 107. Petitioner will comply with the weight limitations of Part 107 and will ensure that external loads do not negatively impact flight characteristics, as required by Part 107.
Performance Charts	Not applicable.
Effects of exceeding aircraft performance limitations	Not applicable. Topics applicable to unmanned aircraft are included in Part 107.
Pilotage and dead reckoning	Not applicable.
Use of air navigation facilities	Topics applicable to unmanned aircraft are included in Part 107.
Decision making and judgment	Covered under Part 107.
Principles and functions aircraft systems	Covered by Part 107 and by Petitioner's UAS Flight Operations and Procedures Manual
Emergency operations	Covered under Part 107.
Night and high altitude	Not applicable.
Operating within the national airspace	Covered under Part 107.
Lighter than air ratings	Not Applicable.

In the Powers Flight Group Exemption, the FAA determined that an adequate level of

safety at least equal to § 61.127 (Flight Proficiency) could be achieved for a UAS that is able to demonstrate preflight preparation; preflight procedures; airport and heliport operations; hovering maneuvers; takeoffs, landings, and go-arounds; performance maneuvers; navigation; emergency operations; special operations; and postflight procedures. Petitioner has demonstrated proficiency for small UAS under Part 107, and has incorporated these standards into its Flight Operations Training program for PICs operating the T16. Thus, Petitioner is able to achieve a level of safety similar or exceeding the existing rules and the Powers Flight Group Exemption.

In the Powers Flight Group Exemption, the FAA determined that, because UAS are far less complicated than manned aircraft, Powers Flight Group could achieve an adequate level of safety at least equal to § 61.129 by requiring 20 hours of total flight time of a multi-rotor system as the PIC with at least 10 take-off and landings. Petitioner far exceeds this requirement and the Petitioner's Flight Operations Training program sets this requirement as a minimum standard, and therefore, Petitioner is able to achieve a level of safety at least equal to the existing rules.

4. Federal Register Summary

Pursuant to Title 49 U.S.C. § 44807, Special authority for certain unmanned aircraft systems and 14 C.F.R. Part 11, 49 U.S.C. § 44701(f), and 14 C.F.R. Part 11, the following summary is provided for publication in the FEDERAL REGISTER, should it be determined that publication is needed:

> Petitioner seeks an exemption from the following rules in Title 14 of the Code of Federal Regulations: 61.3(a)(1)(i); 91.7(a); 91.119(c); 91.121; 91.151(b); 91.405(a); 91.407(a)(1); 91.409(a)(1) and (a)(2); 91.417(a) and (b); 137.19(c), (d), (e)(2)(ii), (e)(2)(iii) and (e)(2)(v); 137.31; 137.33; 137.41(c); and 137.42. Petitioner requests an exemption for the purpose of operating Unmanned Aircraft Systems (UAS) weighing 55 pounds or more to dispense to dispense agricultural products to improve waterfowl habitat by controlling invasive species that are detrimental to waterfowl and support agricultural efforts by controlling flora and zoological pests that compete with or prohibit the development of agricultural crops intended to benefit waterfowl. The relief requested is similar to that granted in Exemption No. 18009 to Powers Flight Group.

5. Manuals and Attachments

In support of this Petition, Petitioner will deliver the following associated UAS operating documents:

a. UAS Flight Operations and Procedures Manual
b. Flight Operations Training Manual
c. Flight Operation Safety Requirements and Risk Mitigation Manual
d. Pre-Flight and Post-Flight Safety Checklist
e. DJI Agras T16 User Manual
f. DJI Agras T16 Safety Guidelines

Petitioner acknowledges that it will rely on all manufacturer's operating manuals and procedures (in the latest edition issued by the manufacturer) for the operation of the UAS, and will such manuals as well as the Pre-Flight and Post-Flight Safety Checklist will be accessible during all UAS operations that occur under this exemption and made available to the Administrator upon request.

TURNER ENTERPRISES, INC.

6. Conclusion

Petitioner hereby requests exemptions from the regulatory provisions listed above. As set forth in detail above, such exemptions are in the public interest, and granting the exemptions will not adversely affect safety because the exemption will provide a level of safety at least equal to the existing rules.

Respectfully,

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